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ABSTRACT

The authors developed a Web-based negotiation system that is closely modeled on real-world transactions. This paper illustrates the generality of the system by discussing two disparate applications of the system: one taken from business and the other from collaborative e-learning. The application generates, in real time, transparency-controlled networks of virtual connections between users. This paper first looks at the general features of such a system before applying them to employment negotiations in the business context. It then describes how the same system can be used in an e-learning environment for matching team leaders/mentors/tutors with groups of students. The effectiveness of this system is based on three factors: a good knowledge management system; user-determined levels of privacy; and iterative, computer-supported interactions between users. (Contains 11 references.) (Author/AEF)

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HWONS: A Hyperwave Online Negotiation System

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Abstract: We have developed a Web-based negotiation system that is closely modeled on real-world transactions. In this paper we illustrate the generality of the system by discussing two disparate applications of the system: one taken from business and the other from collaborative e-learning. In the business context we look at online employment negotiation. In the e-learning case, we discuss a scenario where a large (or small) class of students interacts with team leaders to form groups for project work.

1 Introduction

Since our application is built on top of the Hyperwave (HW, 2001; HWTW, 1999; Maurer, 1996) knowledge management system (Borghoff & Pareschi, 1997), it inherits the adaptability of a commercially robust hypermedia system, with advanced access rights and document attributes. This paper shows how, building on these features, an online negotiation system can be designed to be interactive, personalized and scalable, while supporting user-controlled degrees of privacy. Interestingly, the negotiations can be supported in ways that more closely resemble traditional methods. These processes aim to find the "right person for the right job/team" – and it is usually an iterative process.

The application generates, in real time, transparency-controlled networks of virtual connections between users. We shall first look at the general features of such a system before applying them to employment negotiations. We shall then describe how the same system can be used in an e-learning environment for matching team leaders/mentors/tutors with groups of students.

The effectiveness of our system is based on three factors:

A good knowledge management system (see Section Two).

User-determined levels of privacy (see Section Three).

Iterative, computer-supported interactions between users (see Section Four).

2. The Hyperwave Knowledge Management System

Hyperwave[1] was developed to store high-volume hypermedia resources, which can be spread over multiple servers (HW, 2001; HWTW, 1999). Hyperwave has a more sophisticated design model than most Web server systems (Maurer, 1996). For example it supports the following attributes:

[1] http://www.hyperwave.com/index.html

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- Read and write permissions for groups and individuals
- Extra search keywords
- Titles in different languages
- Display properties
- Custom attributes
- Setting of a time period during which the document is visible to the public.
- Version control
- Similarity recognition of documents

Since attributes are not stored within the objects (as in most Web servers) but in a separate database, they can be efficiently extracted and manipulated. In addition, objects can be locked to ensure they are not updated concurrently. It is features such as these that are utilized in our negotiation system.

2.1 The Hyperwave Online Negotiation Environment.

The three main parts that form the environment for our Online Negotiation System (ONS) are illustrated in Figure 1, reading from left to right.

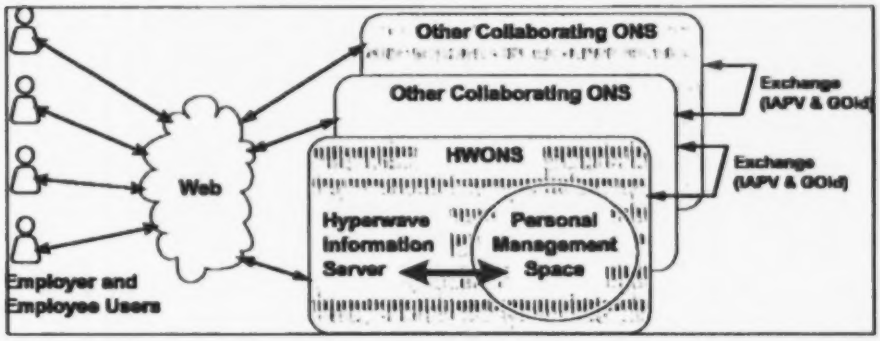

Figure 1: An Overview of the Hyperwave Online Negotiation System

The negotiation system receives information via Forms and stores and updates the information in a Personnel Management Space. This is a Hyperwave database that contains personalized records and automatically generated attributes (HWTW, 1999). After storing the necessary data about the negotiation parties it will search through the Personnel Management Space, matching attributes, and return the results. Users can then update or delete any of the details they have already sent to the system and request new services such as further negotiation.

2.2 The Expression of User's Details in a Compact Vector Format

Key attributes for any pair of negotiators are identical but complementary in meaning (what an employer requires is what an employee should posses, and vice versa). To keep things concise, yet meaningful, we choose strings (*UAPVs*) that combine characters for attribute names, and digits as the corresponding values (actually, index-numbers in pre-defined lists). Using this format, the sequence of attributes in a *UAPV* can be arbitrarily ordered, and the length can be flexible. Hence we can use the same *UAPV* format for the two types of users, and the searching process involves matching vector couples.

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Since different users will have different priorities (e.g., some people may regard job location is the most important factor, but others may consider salary is more important) we also use a weighting process to assist *UAPV* matching. The *UAPVs*, together with the importance sequence (weighting), and other system-required information, are then stored in the Hyperwave document management system.

3 Transparency-Controllable Virtual Connections

In many negotiation situations privacy can be a key issue. People may have confidence in a human agent but do they trust an online system with just a few lines of privacy policy statement? For example, a statement of privacy may not be good enough if users can just post their background information without any options to "hide" and control them (CntPub, 2000). Neither does it make users feel "safe" enough, if a sufficiently interactive mechanism is not provided. Furthermore, the system should allow users to request services like 'Please let me know what you have found for me before you show my real name (or other details) to the other negotiator ...'. Thus it should be the users themselves who are permitted to set which, and when, private details are visible to the other party in the negotiation. Hence, the virtual connections should be *transparency-controllable*.

Thus, users can keep many details hidden, particularly in the first stages of negotiation. It is important to note that searching and matching can be performed on all stored data and not restricted to the visible attributes – even though users may be unable to see this information.

4 Negotiation Cycles

As mentioned previously, the matching of employers and jobseekers, or moderators and group members, is usually achieved by negotiation. This means that no matter how good the matching algorithms used are, the system must support iterative cycles. For example, a team leader may have set the qualification level too high, with the expectation that they will be lowered if there is a candidate that fulfills other attributes. Similarly, a student may not be experienced enough to even set a reasonable time allocation for a given project. We propose a system that alerts users at login time of any likely new matches. Then, if any of these candidates are of interest, the system can set up virtual connections. Candidates will be alerted and respond if interested. The process is cyclic as shown in Figure 2.

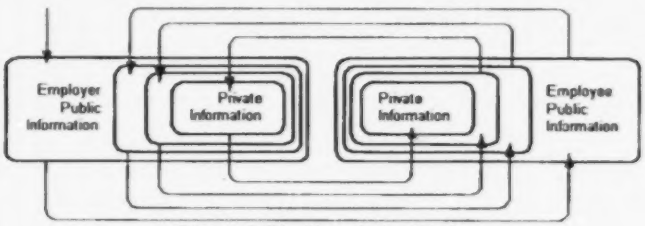

Figure 2 The Negotiation Cycle

Since all matching is done in real time we will avoid out-of-date messages such as those given by CGI scripts and email.

In the iterative negotiation cycle described above, we would expect to see transparency increase. This is because, for example, employer/group leader can invoke the interactive functions of the system to request the employee/student to reveal details appropriate to the stage of negotiation. And, of course, the converse is also true.

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5. Applications

We shall first describe the prototype we have built as an online employment service. This will be followed in Section 5.2 by a discussion of how it can be adapted to an e-learning environment.

5.1 The Hyperwave Online Employment System (HWOES)

The system we have implemented is based on Hyperwave (HW 2001; HWTW 1999; Maurer, 1996) and is called the Hyperwave Online Employment System (HWOES). The implementation details are described in (Liu, 2001; Lennon, 2002). Certainly, online employment systems such as Monster (Mnstr, 2001), HotJobs (HotJ, 2001), Career Mosaic (HeadH, 2001) and The Jobs Company (Jobs, 2001) (to name but a few) handle millions of employment cases annually and are expanding their services steadily. However we have demonstrated that our system has significant advantages, particularly as far as privacy and cyclic negotiations are concerned.

Sign-in Forms for employers (see Figure 3) and employees provide the necessary information items for HWOES. Key attributes that are used to do the matching are clearly pre-defined in option lists to avoid errors. Text, graphics and even videos (e.g. an inaugural television spot for the client) are also supported as attachment documents. Part of the Form for employers is shown in Figure 3.

In the Form, the eye icon indicates that a prospective employee can see an item, whereas a negated eye indicates that, at present, the data is restricted. In the screen shot the icons indicate the default settings for the data. Of course, these settings can be changed by the owners later in the negotiation process. The completed form will then be sent to the Personnel Management Space (*PMS*, the database) to be stored and UAPVs created or updated. Naturally, there is a corresponding Form for employees.

Figure 3 Part of a Form for Employer information entry and update (Liu, 2001)

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5.2 E-Learning Negotiation

By changing the fields on the two basic data entry and update Forms we can readily transform the application into an e-learning negotiation tool. Let us consider the example of a class that has to form groups for project work in multimedia. Instead of using Forms with fields such as Job, Location, Salary etc., we will have Forms with 'Project name', 'Experience', 'Time to Complete' etc. Now we will have the project leaders negotiate with class members to form the best team for their particular project. For example, under 'Experience' the system may list Instructional designer, Graphic artist, Systems Analyst, Programmer etc. The leader can select and prioritize these requirements. The system will then find the students with the best matching attributes.

Of course there will be competition and here we can see that we have a very good "role-playing" scenario where all the players have to carefully consider how they prioritize their options. For example students will have to carefully consider what they have to offer when they select various projects and, most importantly, just how much time they are prepared to commit to the project. The project leaders on the other hand will be competing for students and they will have to similarly choose the attribute values that they are looking for with care.

6 Conclusion

The proposed system and prototype gives users significant control over the levels of privacy they need during online negotiations. Virtual connections supporting cyclic negotiation between negotiators are set up in real time and can be modified in real time. We have prototyped an online Employment service and now we propose minimal changes to adapt it to other types of negotiations such as those that occur in group learning.

7 References

Borghoff, U., & Pareschi, R. (1997). Information Technology for Knowledge Management; *J.UCS* 3, 8, 835-842.

CntPub, (2000). *How Online Recruitment Is Shaking Up Its Own Industry, New Media Age*, Centaur Publishing Ltd., April 13, p41.

HeadH, (2001). The HeadHunter Company - http://www.headhunter.net/, October 2001.

HotJ, (2001). The HotJobs Company - http://www.hotjobs.com, May 2001.

HW, (2001). The Hyperwave portal http://www.hyperwave.com.

HWTW, (1999). The Technical White Paper of Hyperwave Information Server V5.0.

Lennon, J., & Liu H., & Maurer H. (2002). HWOES: A Hyperwave Online Employment System; To appear in *J.UCS* April.

Maurer, H. (1996). *Hyperwave: The Next Generation Web Solution*. Addison-Wesley, UK.

Jobs, (2001). The Jobs Company - http://www.jobs.com.

Liu, H. (2001). *Hyperwave Online Employment System*. University of Auckland, New Zealand thesis.

Mnstr, (2001). The Monster Company - http://www.monster.com, May 2001.

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